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Preparing 21st Century Teachers: Implementation of 4C Character's Pre-Service Teacher through Teaching Practice

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Abstract. The implementation of education in the 21st century has a different direction compared to the previous century. Education in the 21st century is expected to produce outcomes for students who are ready to enter the post-industrial era (industrial revolution 4.0). The direction of education in the 21st century is no longer holding education aimed at preparing people in a simple, static / linear, and predictable world. The characteristics and demands of the 21st century above produce four learning characters of 21st century, namely: (1). Critical Thinking and Problem Solving; (2) Creativity and Innovation; (3) Communication; (4) Collaboration. For this reason, pre-service and in-service teachers are expected to be able to create learning with HOTS (High Order Thinking Skills) outputs. the topic of this research is how to prepare 21st century teachers in terms of the 4C characters, especially for pre-service teachers.

Keywords: Preparing 21st Century Teachers; Industrial revolution; Teachers.

1. Introduction

The success of education is a future-oriented activity. National Education of 21st century aims to realize the ideals of the nation, which is the people of Indonesia who are prosperous and happy with a respectable and equal position with other nations in the global world through the formation of a society consisting of qualified human resources; namely individuals who are independent, have a will, and are capable to realize the ideals of the nation [1]. The implementation of education in the 21st century has a different direction compared to the previous century. Education in the 21st century is expected to produce outcomes for students who are ready to enter the post-industrial era (industrial revolution 4.0). The direction of education in the 21st century is no longer holding education aimed at preparing people in a simple, static / linear, and predictable world. The direction of education in the 21st century or commonly referred to the knowledge era has the purpose of education, namely; (1) preparing people in the dynamic and unpredictable world, (2) fostering creative behavior, (3) giving freedom for unique individual intelligence, and (4) producing innovators. For this reason, one of the directions of the Sustainable Development Goals in Indonesia is the development of human resources through the improvement of quality education. One indicator of quality education in 2030 is to significantly increase the supply of qualified teachers. However, according to Alisjahbana [2], this indicator is still far from the target. According to BPS data [3], the percentage of teachers with bachelor (S1) qualifications is in the good category. Figure 1 shows the availability of teachers in Indonesia in each level.



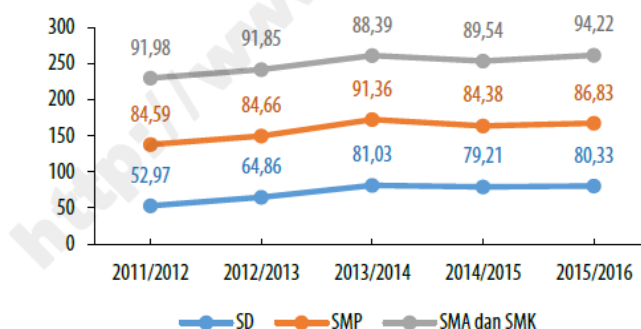


Figure 1. Percentage of teachers with bachelor (S1) qualifications in Indonesia [3]

To prepare the students to face the 21st century, there is a need for teachers who can inspire the learning process. The 21st century generation has the characteristics of multitasking, multimedia, and online info searching. To create the generation of the 21st century above, it requires a number of skills that must be possessed by pre-service and in-service teachers. Pre-service and in-service teachers must have digital skills (know and master the digital world), Agile thinking abilities (be able to think multiple scenarios), interpersonal and communication skills (possess communication skills to argue), global skills (possess skills including foreign language skills, ability to adapt with foreigners who have different cultures, and have sensitivity to cultural values). The characteristics and demands of the 21st century above produce four learning characters of 21st century, namely: (1). Critical Thinking and Problem Solving; (2) Creativity and Innovation; (3) Communication; (4) Collaboration. For this reason, pre-service and in-service teachers are expected to be able to create learning with HOTS (High Order Thinking Skills) outputs.

According to the Government Regulation Number 74 of 2008 concerning teachers, it requires teachers to have academic qualifications, competencies, and educator certificates. Certificates are obtained after the teacher has taken the Teacher Professional Program (PPG). This teacher professional education was taken for one year after the teachers completed their bachelor degree (S-1) studies. After PPG was initiated as a requirement for teaching, currently, the Education Internship substitutes the term of Field Practice (PPL) in the LPTK. It is changed because the field practice (PPL) will be obtained in PPG. Curriculum policies at the LPTK based on Government Regulation No. 12 of 2012 concerning Higher Education in 2014 also had an impact on the curriculum of education study program in Semarang which result the implementation of the education internship program in 2014.

Education Internship is in the form of practical academic activities which include learning by doing in order to form knowledge, skills and attitudes. The Education Internship provides an earlier exposure to build the identity of prospective educators, establishes educational academic competencies and fields of study, strengthens the initial ability of prospective teacher, and fosters the pedagogical skills in developing the area of expertise of prospective educators. Education Internship is also a practical academic activity that focuses more on managerial and learning in schools. Education internship aims to prepare independent candidates who are able to solve problems and can make decisions wisely so that they have pedagogic, professional, social and personality competencies mandated by Constitution. Another goal of implementing the education internship program is to equip prospective teachers to understand the process of implementing full education at school.

Education internship is also in the form of learning by doing in order to prepare the initial ability of prospective educators by carrying out the learning process in a particular field with inherent guidance of model teachers and supervisors, the assistance tasks for students, and extracurricular activities.

Therefore, the topic of this research is how to prepare 21st century teachers in terms of the 4C characters, especially for pre-service teachers.

The rest of this paper is organized as follow: Section 2 describes the proposed research method. Section 3 presents the obtained results and following by discussion. Finally Section 4 concludes this work.

2. Research Method

This research is a qualitative research with case study design. To achieve the above objectives, this research is carried out with qualitative approach with case study design. Information is collected by: (1) documentation, (2) interview, and (3) observation. Determination of information sources started from key informants and continued with other informants in snowball. Collected data were analyzed by: (1) data reduction, (2) data presentation, and (3) conclusion. The subjects in this study were 32 pre-service teachers. The subjects are taken are students of the Faculty of Mathematics Education Teaching and Education Universitas Muhammadiyah Semarang as a participant of teaching practice. The variables in this study are critical thinking skills and problem solving, creativity, communication and collaboration of pre-service teachers Educational Activities.

The variable indicator of Teaching critical thinking skills and problems solving skills are IDEALS (Identify the problem, Define the context, enumerate the choices, analyze options, list reasons explicitly and self correct) adapted form Facione [4]. The variable indicator of creativity are (1)Think Creatively and (2)Work Creatively with Others that was adapted form Piirto [5]. The variable indicator of communication in teaching are (1) clarifying the purpose or intention of a message in relation to audience, context or culture, (2) considering perspectives, emotions and experiences when seeking shared understandings, (3) decoding and interpreting ideas or information shared through verbal or non-verbal formats, (4) expressing ideas or concepts using appropriate language, conventions or protocols, and (5) demonstrating respect and responsibility when communicating with others that was adapted from Albertas Government.

The variable indicator of collaboration are (1) sharing responsibilities and supporting others to achieve a common goal, (2) demonstrating sensitivity to diverse cultures, audiences or contexts when working with others, (3) exhibiting reciprocity and trustwhen sharing ideas or roles, (4) valuing -exibility, compromise and the contributions of others to nurture positive working relationships that was adapted from Albertas Government. The instruments used in this study were CoRe, questionares, open ended interview sheet, Bertram [6] and Williams [7]. The first data gathering technique used documentation method. This documentation method used an instrument in the form of a Content sheet of Representation (CoRe). This stage is called CoRe preparation task design. First, pre-service chemistry teachers were invited to write individual Co- Re specific themes. They were asked to work independently and not to discuss their plans with each other. After the pre-service teachers make CoRe, then they were asked to teach by using CoRe. Observation techniques were used in this stage. The second data gathering technique used semi- structured techniques interview. The informant were prospective chemistry teacher education students and in service teacher as a role models. The interviewer asked structured questions related to 4C variable. Then, deeper questions were given one by one to get more information. This interview is based on an unlimited (unbound) question of the answer. The interviews took place pada rentang terlaksananya kegiatan magang

During the interviews, pre-service and in-service chemistry teachers were encouraged to talk about 4C variable. The duration of the interviews varied from 25 to 50 minutes depending on how much time student-teachers wanted to have. For this stage, in addition to teacher informants, data from students were also gathered. The researcher acted as the main instrument in this study by using the analytical guide to accommodate the research data.

3. Result and Discussion

High, medium and low criteria were used in the 0-1 range to see the characteristics of critical thinking and problem solving, creative and innovative characters, communication, and collaboration on learning conducted by pre-service teachers during educational internship activities. The following are the results of research on 4C implications in learning activities conducted by pre-services teachers.

3.1 Critical Thinking and Problem Solving

According to Snyder and Snyder [8], to produce critical thinking skills, students then requires training, practice, and patience. For this reason, pre-service teachers must also implement these skills starting from the preparation stage to the learning evaluation stage. In this study, the assessment of critical thinking skills of pre-service teachers is assessed through the preparation stage (lesson plans and CoRe documents) and the implementation of learning observed by model teachers, students and researchers. The performance of teaching critical thinking of pre-service teachers can be seen in Figures 2 and 3.

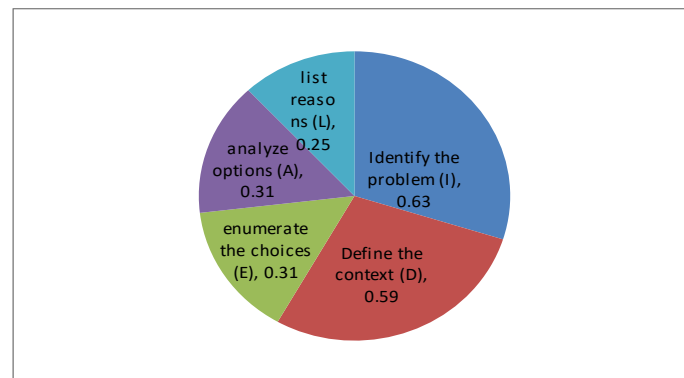


Figure 2. Performance of teaching critical thinking skills of pre-service teachers (in terms of CoRe and lesson plans documents)

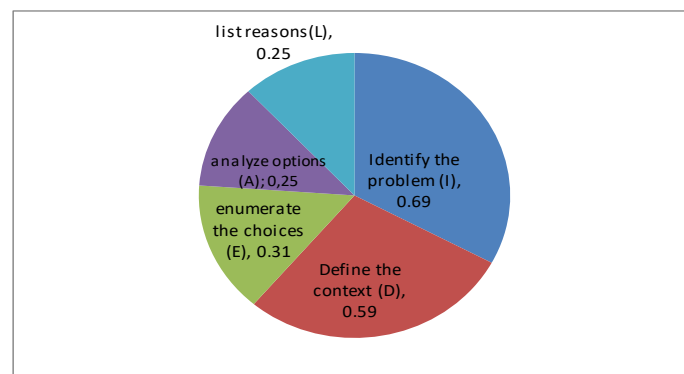


Figure 3. Performance of teaching critical thinking skills of pre-service teachers (in terms of the implementation of learning)

From the data above, it can be seen that teaching critical thinking skills carried out by pre-service teachers during teaching practice are still in the medium category (indicators of the Identify the problem and Define the context). Meanwhile, the other indicators are still in the low category.

3.2 Creativity and Innovative

The readiness of educating in the 21st century on the second indicator measured in this study is Creativity and Innovative. The variable indicators of creativity are (1) Think Creatively and (2) Work Creatively with Others that was adapted from Piirto [5]. The data of Think creatively is assessed based

on CoRe and lesson planse made by pre-service teachers. Meanwhile, the Work Creatively indicator is assessed through the student performance during an internship activity. The following are the creative and innovative performance data of pre-service teachers during the education internship activities (see Figure 4).

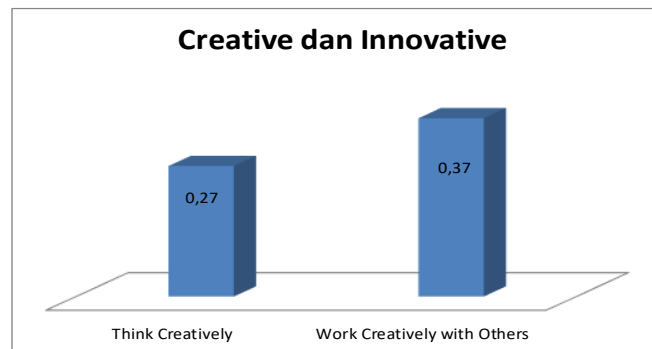


Figure 4. Performance of Creativity and Innovative of pre-service teachers

From the data above, indicators of Think creatively have sub indicators (1) Use a wide range of idea creation techniques (such as brainstorming), (2) Create new and temporary ideas (both incremental and radical concepts) and (3) Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts. Meanwhile, the indicators of Work creatively with others have sub indicators; (4) Develop, implement, and communicate new ideas to others effectively, (5) be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work, (6) Demonstrate originality and inventiveness in working and understand the world limits to adopting new ideas, (7) View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes. The following are research data for each indicator shown in Figures 5 and 6 below.

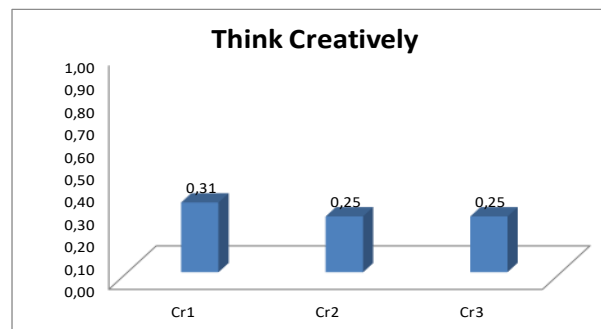


Figure 5. indicator performance of think creatively of pre-service teachers

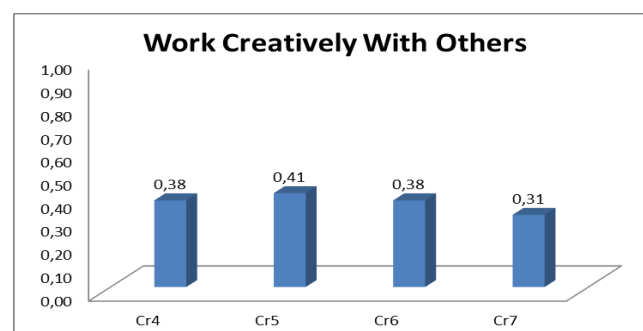


Figure 6. indicator performance of work creatively with other of pre-service teachers.

3.3 Communication

The skills of 21st century that teachers must also have are communication. Communication skills include sharing ideas through oral, written or non-verbal media. Indicator of communication skills is measured from the implementation of classroom learning and scientific articles that are the product of the output of education internship activities. Indicators on this skill include (1) clarifying the purpose or intention of a message in relation to audience, context or culture, (2) considering perspectives, emotions and experiences when seeking shared understanding, (3) decoding and interpreting ideas or verbal or non-shared information -verbal formats, (4) expressing ideas or concepts using appropriate language, conventions or protocols, and (5) demonstrating respect and responsibility when communicating with others following data on communication skills of prospective teacher students (see Figure 7).

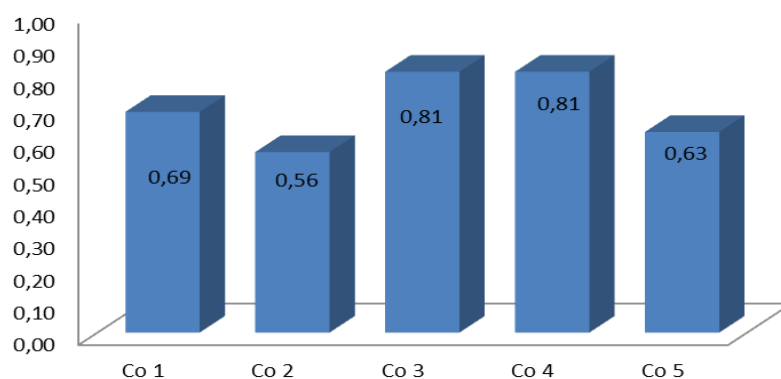


Figure 7. Performance of communication skills of pre-service

3.4 Collaboration

Another skill that must be possessed and applied by pre-service and in-service teachers in the learning process is the skill of collaboration. Indicators of collaboration skills that are measured in this research are (1) sharing responsibilities and supporting others to achieve a common goal, (2) demonstrating sensitivity to diverse cultures, audiences or contexts when working with others, (3) reciprocity and trust exhibiting sharing ideas or roles, (4) valuing accessibility, compromise and the contribution of others to nurture positive working relationships. Data on the collaboration skill performance can be seen in Figure 8.

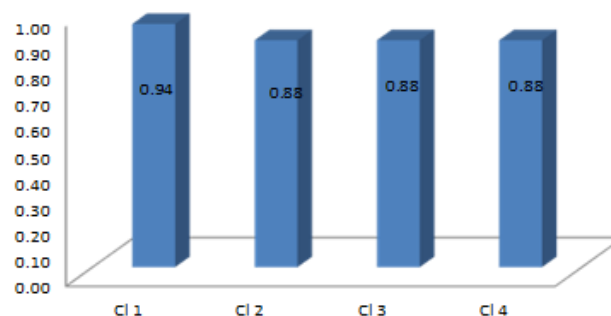


Figure 8. Performance of collaboration skills of pre-service teachers

3.5 Discussion

Education is basically the process of preparing students to have the readiness to face a better future, to have independence, and to be prepared to face various problems. The success of education cannot be separated from learning activities carried out by educators both teachers and lecturers.

The teacher is a professional position that provides expert services and demands adequate academic and pedagogical abilities. Teachers as professional positions must be prepared through a relatively

long education program and it is designed based on teacher competency standards. Based on the results of this study, it can be seen that Indonesia still has many new tasks to complete to face the 21st era, especially in the field of education. Based on the case studies that have been conducted, the skills of prospective teachers that need to be improved are critical thinking and creativity skills. The four 21st century learning characters are: (1) Critical Thinking and Problem Solving; (2) Creativity and Innovation; (3) Communication; (4) Collaboration. Here are suggestions that can be given to educators. These tips are used to help students and educators in Indonesia. They are ready to face the 21st century. Implementation of 4C skills through educational internship activities.

3.6 Critical Thinking and Problem Solving

One of the factors causing the low performance of critical thinking skills of pre-service teachers is the curriculum that they have experienced is score-oriented. As a result, pre-service teachers become individuals who are not accustomed to developing the ability to ask questions. This is consistent with various studies conducted by Ladsman & Gorski in [9], by Sandholtz, Ogawa, & Scribner in [10] and Wong [11]. According to the results of Snyder's research [8], the main obstacle why an educator cannot bring the character of critical thinking learning well during the teaching and learning process are: (1) lack of training, (2) lack of information, (3) preconceptions, and (4) time. One of the improvements that can be done so that students can demonstrate good critical thinking skills in teaching is to always carry out learning using the scientific approach. Just as students learn the process of the scientific method, they must also learn the process of critical thinking, because the scientific approach of educators and students will systematically think analytically, openly and dare to express ideas / concepts based on the knowledge they learned.

3.7 Creativity and Innovation

These characters encourage the formation of the character of students to have the ability to develop, implement, and provide new ideas to others, as well as being open and responsive to different new perspectives. By Sternberg in [12] writes that creativity is the key to discoveries. To be able to improve the creative thinking skills of learners, the connection between learning styles and the conditions of geography and culture that exist around the students is needed. That means, learners are not only asked to just solve the problems in order to get good grades. However, to enhance these skills, work product associated with teaching materials and the environment they live is require.

3.8 Communication

Communication skills require educators to understand, manage and create effective communication in various forms and contents in speaking, writing, and multimedia. Educators are given the opportunity to use their ability to express their ideas both when having discussion with their friends and when conducting teaching and learning activities in the classroom. Based on the results of the study, this skill is considered to be good. However, based on the research conducted by Astuti in [13], in-service teachers have low communication skills in the field of writing. To differentiate the quality of in-service teachers, the pre-service teachers need to improve their written communication skills through articles. One of the outputs of UNIMUS's education internship activities is scientific articles. Since 2013, pre-service teachers have conducted scientific publications for collaborative research articles with model teachers and supervisors.

3.9 Collaboration

The collaboration provides an overview where learners demonstrate their abilities in teamwork and leadership, adapt in various roles and responsibilities, work productively with others, place empathy in place, and respect for different perspectives. To grow this character, the learners must be accustomed to work in teams.

4. Conclusion

New standards for what students should be able to do are replacing the basic skill competencies and knowledge expectations of the past. To meet this challenge that all learners need educational experiences in school and beyond, must be transformed in ways that will enable students to acquire the creative thinking, flexible problem solving, collaboration and innovative skills they will need to be successful in work and life.

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